

EHP-A23/RGB33-P01/TR



High Power LED – 1W



Data Sheet



Features

- ◆ Feature of the device: Small package with high efficiency
- ◆ Typical view angle: 120°.
- ◆ ESD protection.
- ◆ Soldering methods: SMT
- ◆ Grouping parameter: Brightness, Forward Voltage and wavelength.
- ◆ Moisture Sensitivity Level: 3
- ◆ The product itself will remain within RoHS compliant version.

Applications

- ◆ Interior automotive lighting (e.g. dashboard backlighting)
- ◆ Decorative and entertainment lighting (incl. fiber optic illumination)
- ◆ Reading light (aircraft, car, bus)
- ◆ Signal and symbol luminaries
- ◆ Marker lights (e.g. steps, exit ways, etc.)

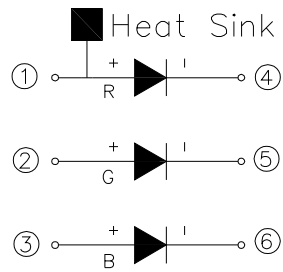
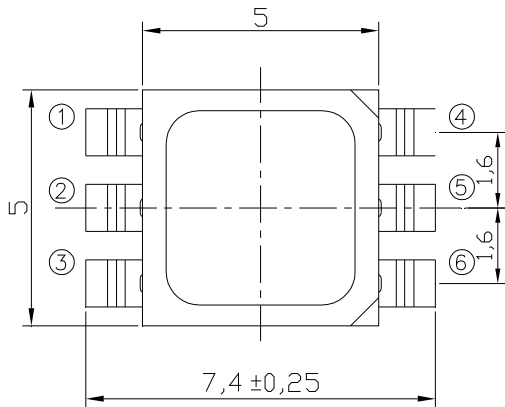
Materials

Items	Description
Encapsulating Resin	Silicone resin
Electrodes	Ag plating copper alloy
Die attach	Silver paste
Chip	G、 B : InGaN
	R : AlGaInP

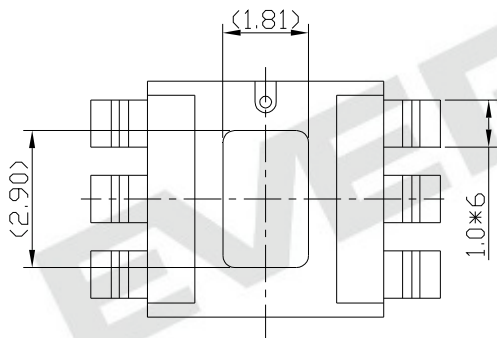
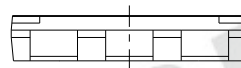
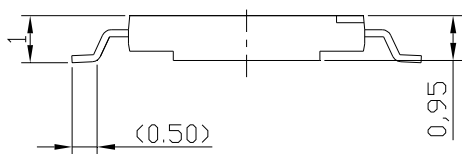
EHP-A23/RGB33-P01/TR
High Power LED – 1W



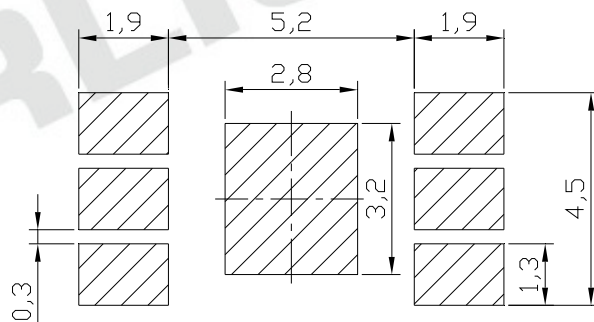
Dimensions



Polarity



Bot. view



Soldering patterns

Notes.

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are $\pm 0.25\text{mm}$.

Maximum Ratings ($T_{Soldering}=25^{\circ}C$)

Parameter		Symbol	Rating	Unit
DC Operating Current	Red	I_F	100	mA
	Green		100	
	Blue		100	
Pulsed Forward Current ₍₁₎	Red	I_{PF}	150	mA
	Green		150	
	Blue		150	
ESD Sensitivity		ESD	2000	V
Junction Temperature		T_j	110	$^{\circ}C$
Operating Temperature		$T_{op.}$	-40 ~ +85	$^{\circ}C$
Storage Temperature		$T_{stge.}$	-40 ~ +100	$^{\circ}C$
Power Dissipation		P_d	1	W

Electro-Optical Characteristics ($T_{Soldering}=25^{\circ}C$)

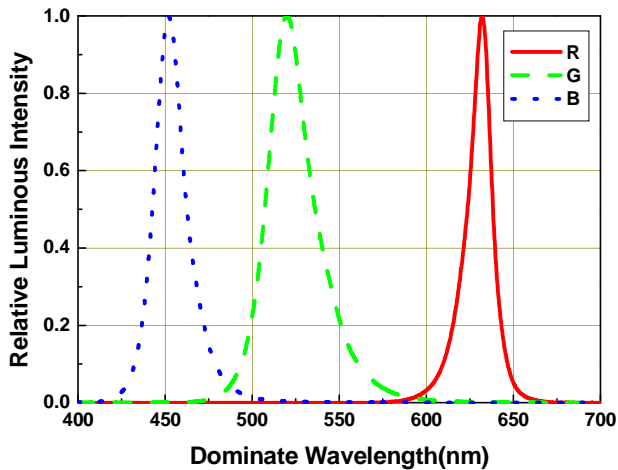
Parameter	Bin	Symbol	Min	Typ.	Max	Unit	Condition
Brightness ₍₂₎	Red	Φ_v	10	----	16	lm	$I_{F1}=100mA(R)_{(5)}$ $I_{F2}=100mA(G)_{(5)}$ $I_{F3}=100mA(B)_{(5)}$
	Green		18	----	24		
	Blue		3	----	6		
Forward Voltage ₍₃₎	Red	V_F	1.8	----	2.6	V	
	Green		2.7	----	3.6		
	Blue		2.7	----	3.6		
Wavelength ₍₄₎	Red	λ_d	620	----	630	nm	
	Green		525	----	535		
	Blue		457	----	467		

Note.

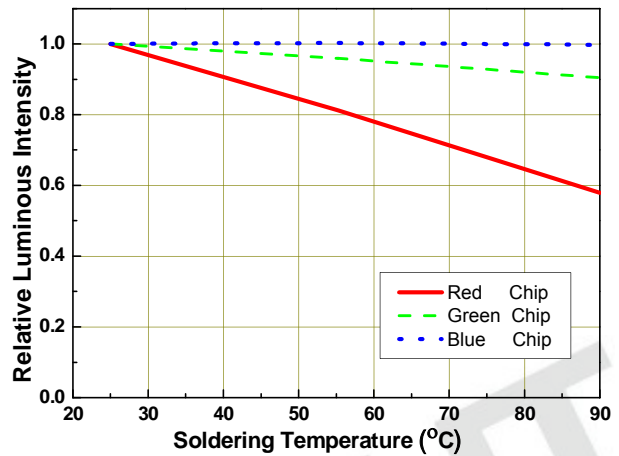
1. t_p 100 μ s, Duty cycle = 0.25
2. Luminous Flux measurement tolerance: $\pm 10\%$.
3. Forward Voltage measurement tolerance: $\pm 0.1V$.
4. Wavelength measurement tolerance: $\pm 1nm$
5. White point coordinates varied with wavelength changing.

Typical Electro-Optical Characteristics Curves

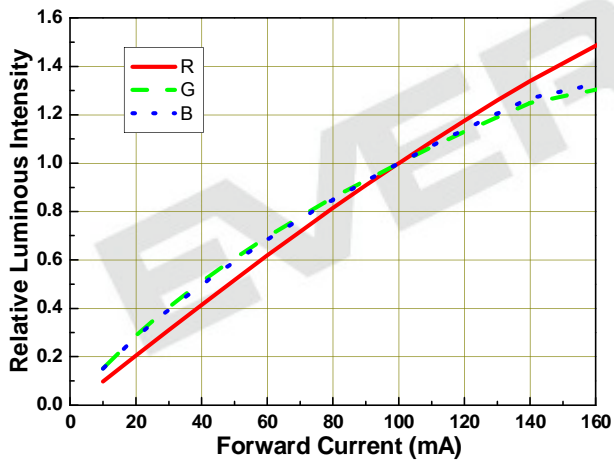
Relative Spectral Distribution,
 $I_F=100\text{mA}/\text{chip}$, $T_{\text{Soldering}}=25^\circ\text{C}$



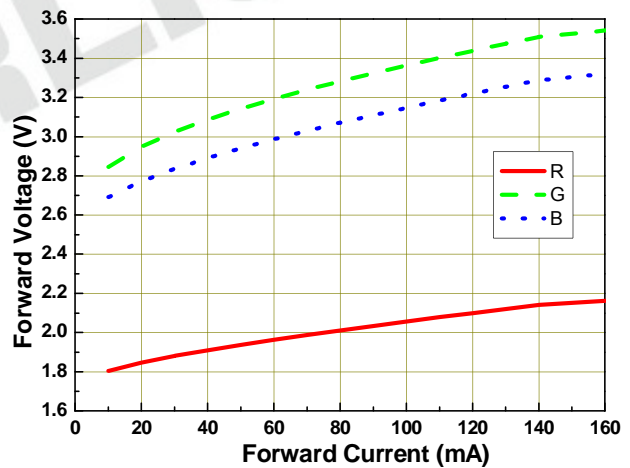
Relative Luminous Intensity vs.
 Soldering Temperature varying



Relative Luminous Intensity vs. Forward
 Current, $T_{\text{Soldering}}=25^\circ\text{C}$



Forward voltage vs. Forward Current,
 $T_{\text{Soldering}}=25^\circ\text{C}$

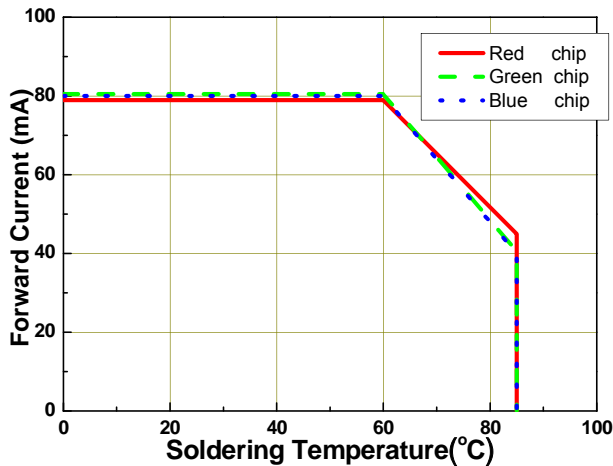


EHP-A23/RGB33-P01/TR

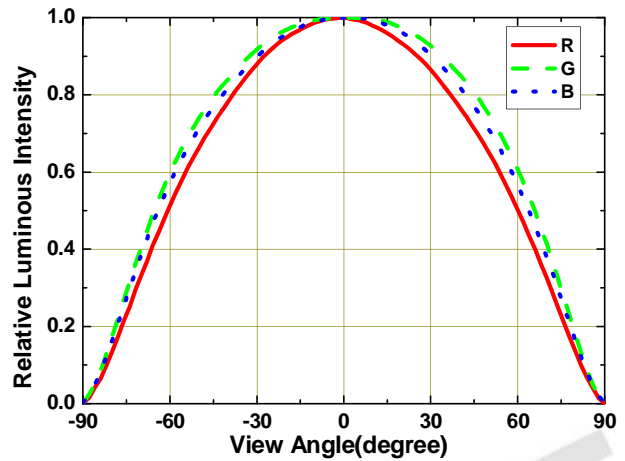
High Power LED – 1W



Soldering Temperature & Operating Current Derating based on $T_{JMAX} = 110$, $I_F=100mA$

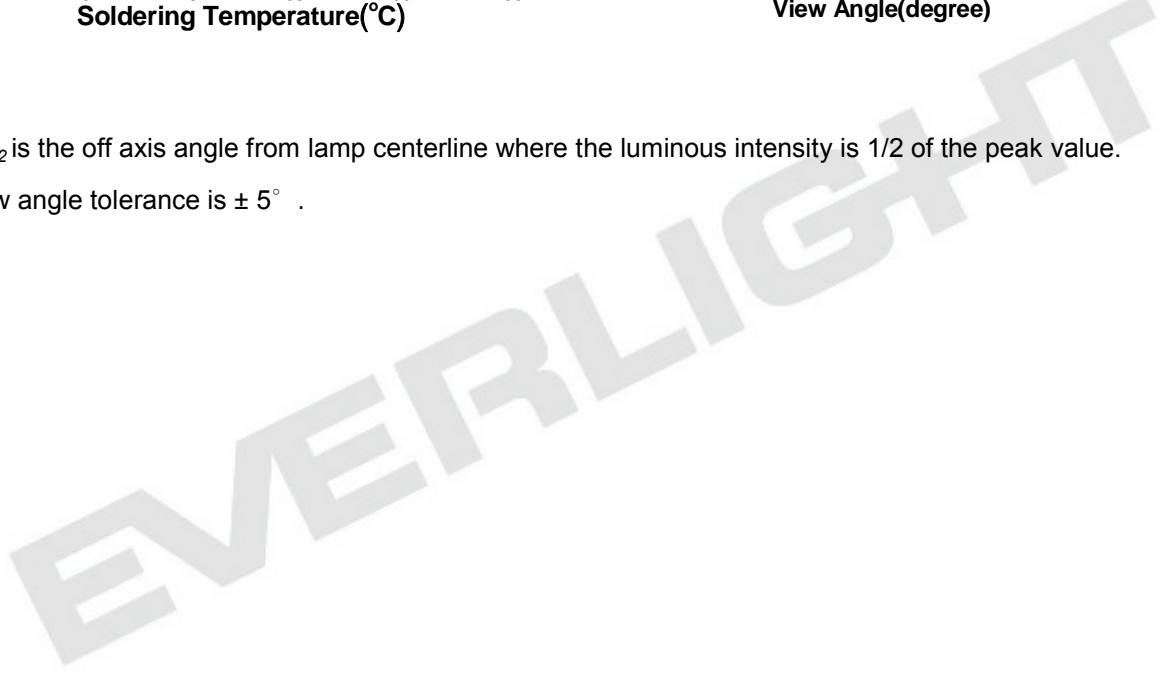


Typical Representative Spatial Radiation Pattern, $I_F=100mA/chip$, $T_{Soldering}=25°C$



Note.

1. $2\theta_{1/2}$ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is $\pm 5^\circ$.



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Label explanation

CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Rank of Luminous Flux

HUE: Color Rank

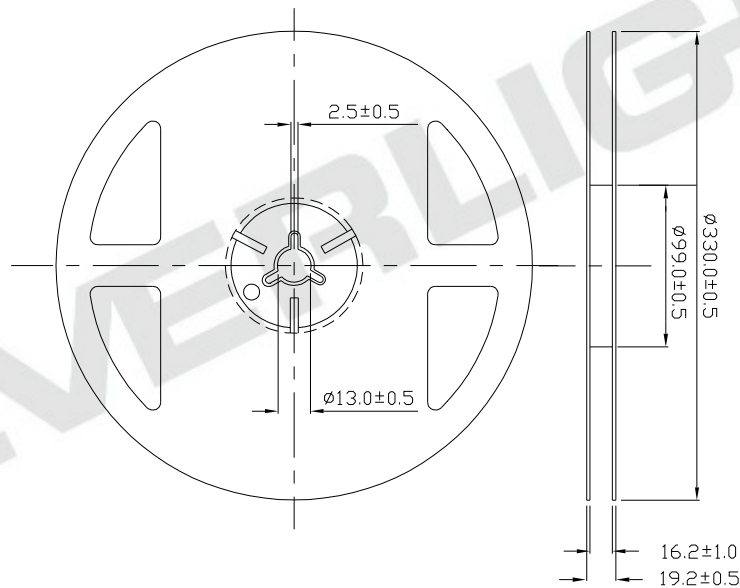
REF: Rank of Forward Voltage

LOT No: Lot Number

MADE IN TAIWAN: Production Place



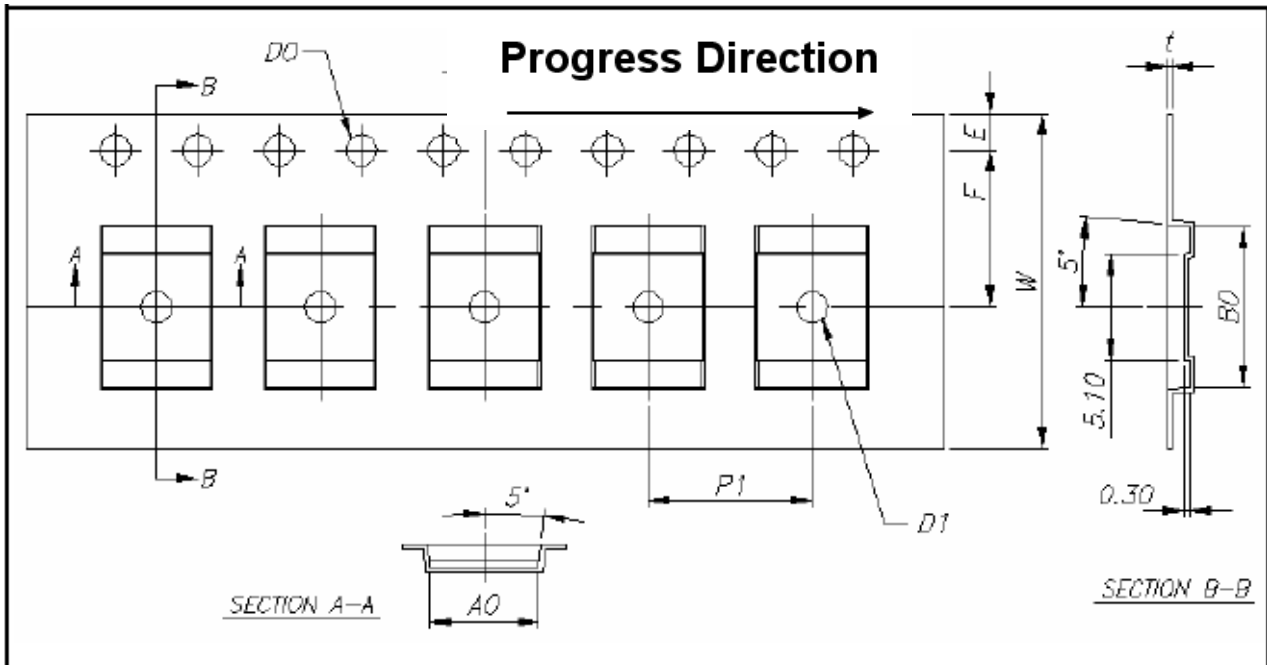
Reel Dimensions



Note.

- 1. Dimensions are in millimeters.
- 2. Tolerances for fixed dimensions are $\pm 0.1\text{mm}$.

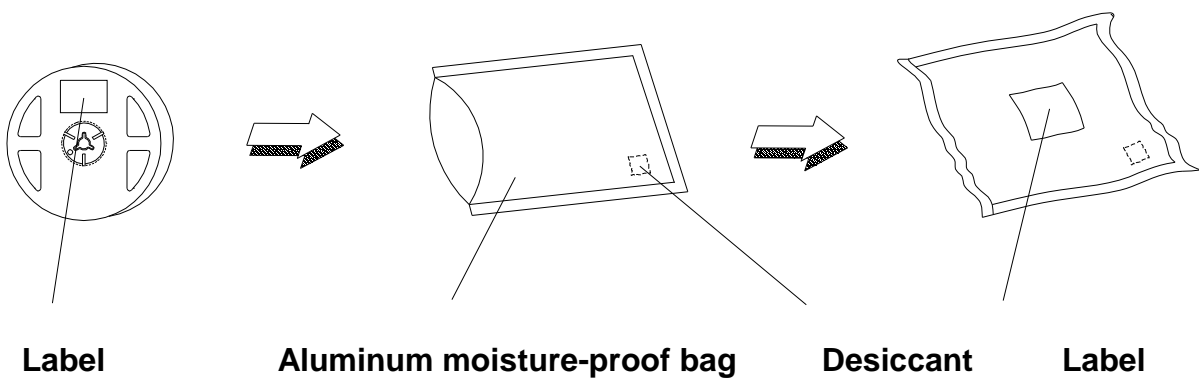
Carrier Tape Dimensions: Loaded quantity 2000 PCS per reel



Note.

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are $\pm 0.1\text{mm}$.

Moisture Resistant Packaging



Reliability Data

Stress Test	Stress Condition	Stress Duration
Solderability	Tsol=260 , 10sec	1 times
Reflow	Tsol=260 , 5sec, 6min	3 times
Thermal Shock	H : + 100 20min. ↓ 20sec. 'L : - 10 20min.	200 Cycles
Temperature Cycle	H : + 100 15min. ↓ 5min. 'L : - 40 15min.	200 Cycles
High Temperature/Humidity Reverse Bias	Ta=85 , RH=85%	1000hours
High Temperature/Humidity Operation	Ta=85 , RH=85%, IF200mA	1000hours
High Temperature Storage	Ta=85	1000hours
Low Temperature Storage	Ta=-40	1000hours
High Temperature Operation Life #1	Ta=25 , IF=300mA	1000hours
High Temperature Operation Life #2	Ta=55 , IF=300mA	1000hours
High Temperature Operation Life #3	Ta=85 , IF=200mA	1000hours
Low Temperature Operation Life	Ta=-40 , IF=300mA	1000hours
Power Temperature Cycle	H : + 100 15min. ↓ 5min. 'L : - 40 15min. IF=200mA, 2min on/off	200cycles

*Im: BRIGHTNESS ATTENUATE DIFFERENCE(1000hrs) < 50%

*VF: FORWARD VOLTAGE DIFFERENCE < 20%

Precautions For Use

1. Over-current-proof

Although the EHP-A23 series has a conductive ESD protection mechanism, customer must not use the device in reverse and should apply resistors for extra protection. Otherwise, slight voltage shifts may cause significant current change resulting in burn out failure.

2. Storage

- i. Do not open the moisture proof bag before the devices are ready to use.
- ii. Before the package is opened, LEDs should be stored at temperatures less than 30 and humidity less than 90%.
- iii. LEDs should be used within a year.
- iv. After the package is opened, LEDs should be stored at temperatures less than 30 and humidity less than 60%.
- v. LEDs should be used within 168 hours (7 days) after the package is opened.
- vi. If the moisture absorbent material (silicone gel) has faded away or LEDs have exceeded the storage time, baking treatment should be implemented based on the following conditions: pre-curing at 60 ± 5 for 24 hours.

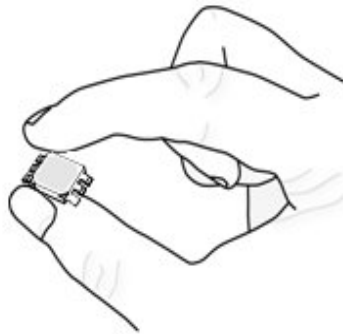
3. Thermal Management

- i. For maintaining the high flux output and achieving reliability, EHP-A23 series LEDs should be mounted on a metal core printed circuit board (MCPCB) or other kinds of heat sink with proper thermal connection to dissipate approximately 1W of thermal energy at 300mA operation.
- ii. Heat dissipation or thermal conduction design is strongly recommended on PCB or MCPCB for reflow soldering purposes. Please refer to soldering patterns on Page 2.
- iii. Sufficient thermal management must be implemented. Otherwise, the junction temperature of die may exceed over the limit at high current driving conditions and the LEDs' lifetime may be decrease dramatically.
- iv. For further thermal management suggestions, please consult the Everlight Design Guide or local representatives for assistance.
- v. Special thermal designs are also recommended to take in outer heat sink design, such as FR4 PCB on Aluminum with thermal vias or FPC on Aluminum with thermal conductive adhesive, etc.
- vi. Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LED lifetime will decrease critically.

4. Proper Handling

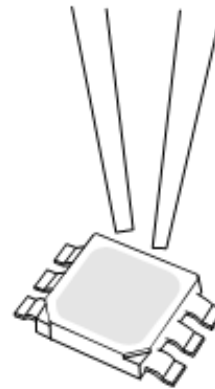
To avoid contamination of materials, damage of internal components, and shortening of LED lifetime, do not subject LEDs to conditions as those listed below.

Bare Hand



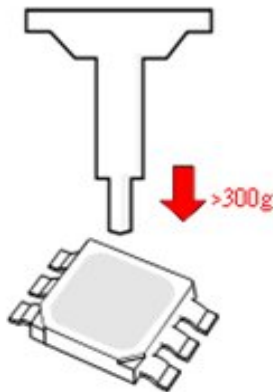
When handling the product, do not apply direct pressure on the resin.

Tweezers



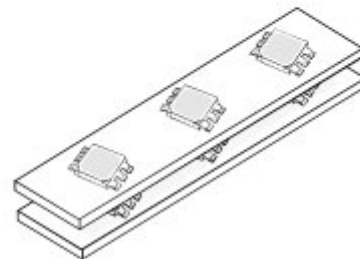
Do not touch the resin to avoid scratching or other damage.

Pick and Place Nozzle for Surface Mount Assembly.



Avoid directly contacting with nozzle.

During Module Assembly

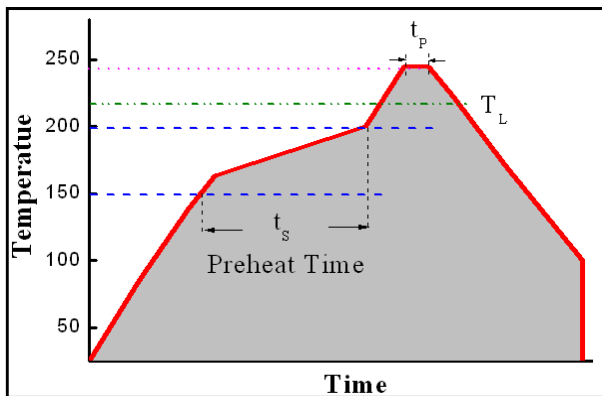


Do not stack the modules together, it could damage the resin or scratch the lens.

5. Soldering Iron

i. For Reflow Process

- a. EHP-A23 series are suitable for SMT process.
- b. Curing of glue in oven according to standard operation flow processes.



Profile Feature	Lead Free Assembly
Ramp-Up Rate	2-3 °C/S
Preheat Temperature	150-200 °C
Preheat Time (t _s)	60-120 S
Liquid Temperature (T _L)	217 °C
Time maintained above T _L	60-90 S
Peak Temperature (T _p)	240±5 °C
Peak Time (t _p)	Max 20 S
Ramp-Down Rate	3-5 °C/S

- c. Reflow soldering should not be done more than twice.
- d. In soldering process, stress on the LEDs during heating should be avoided.
- e. After soldering, do not warp the circuit board.

ii. For Manual Soldering Process

- a. For prototype builds or small series production runs it is possible to place and solder the LED by hand.
- b. Dispense thermal conductive glue or grease on the substrates and follow its curing specifications. Gently press LED housing to closely connect LED and substrate.
- c. It is recommended to hand solder the leads with a solder tip temperature of 280°C for less than 3 second, at a time with a soldering iron of less than 25W. Solder at intervals of two seconds or more.
- d. Take caution and be aware that damaged products are often a result of improper hand soldering technique.

Revision History

Page	Subjects(major change in previous version)	Date of change
	Change the red wd and lm	
2	Change the Dimensions Polarity	31-Aug-2012
3	Change the green light brightness	26-Oct-2012

■ Prepared date: 26-Oct-2012 ■ Device No.: DHE-0001854
 ■ Created by: Betty Hong ■ Rev.: 4

For product information and a complete list of distributors, please go to our web site : www.everlight.com

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